



541 054

(43) International Publication Date  
22 July 2004 (22.07.2004)

PCT

(10) International Publication Number  
**WO 2004/061843 A1**

(51) International Patent Classification<sup>7</sup>: **G11B 19/28,**  
G06F 1/32

(21) International Application Number:  
PCT/IB2004/000016

(22) International Filing Date: 5 January 2004 (05.01.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/438,218 6 January 2003 (06.01.2003) US

(71) Applicant (for all designated States except US): **KONINKLIJKE PHILIPS ELECTRONICS N.V.** [NL/NL];  
Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).

(71) Applicant (for AE only): **U.S. PHILIPS CORPORATION** [US/US]; 1251 Avenue of the Americas, New York,  
NY 10510-8001 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **KORST, Johannes,**

H. [NL/NL]; P.O. Box 220, NL-5600 AE Eindhoven (NL).  
**VAN GASSEL, Joep** [NL/NL]; P.O. Box 220, NL-5600  
AE Eindhoven (NL). **WIJNANDS, Rudi, J.** [NL/NL]; P.O.  
Box 220, NL-5600 AE Eindhoven (NL).

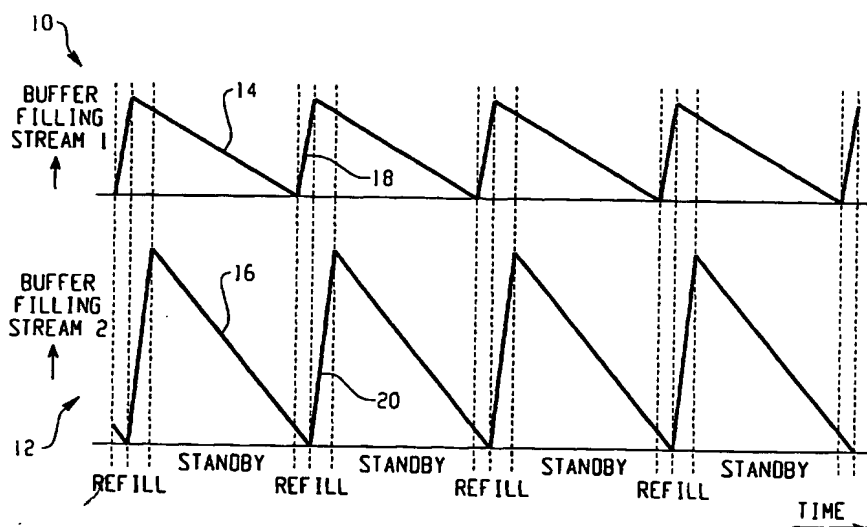
(74) Common Representative: **KONINKLIJKE PHILIPS  
ELECTRONICS N.V.**; c/o LUNDIN, Thomas, M., 595  
Miner Road, Cleveland, OH 44143 (US).

(81) Designated States (unless otherwise indicated, for every  
kind of national protection available): AE, AG, AL, AM,  
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,  
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,  
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,  
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,  
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,  
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,  
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,  
ZW.

(84) Designated States (unless otherwise indicated, for every  
kind of regional protection available): ARIPO (BW, GH,  
GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), Euro-  
pean (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR,

[Continued on next page]

(54) Title: **ENERGY EFFICIENT DISK SCHEDULING FOR MOBILE APPLICATIONS: ADAPTIVELY EXTENDING THE  
DISK STANDBY TIME**



(57) Abstract: A total amount, M, of memory is allocated over streaming data buffers (86). The memory is partitioned over a set of streams (88), each stream being given a partitioned amount of buffer memory. Scheduling is repeatedly performed during each filling/emptying cycle. The scheduling includes: spinning up a storage disk (80), filling/emptying each stream buffer by reading/writing from/to the storage disk until the respective stream buffer is full/empty, determining an earliest next spinning up time, putting the storage disk in standby mode, spinning down the storage disk, re-determining, at or just prior to the earliest next spinning up time, a new earliest spinning up time based on current buffer fullness, iteratively re-determining the new earliest spinning up time until the time is within a predetermined closeness to the previous time, or within a predetermined closeness to the current time, and waiting until the next earliest spinning up time, or just prior to that time.

WO 2004/061843 A1



GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

**Published:**

— *with international search report*

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*